GROSHEV, L. V.,

"How Matter is Organized," Sputnik Agitatora, 1945, No. 19, pp 28-31.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051702(

GROSHEV, L. V., VEKSLER, V., and LAZAREVA, L.,

"Penetrating (Atmospheric) Showers in Cosmic Rays," The Physical Review, 1946, Vol. 70, Nos. 5-6, pp 440-441. (In English available at Battelle Memorial Institute).

"The number of coincidences between counter trays arranged horizontally was compared with that when they were arranged one above the other, and was found to be only about 1/5. The difference, however, could not be ascribed entirely to heavily ionizing particles, as a substantial proportion of the vertical coincidences remained when twelve cm, of Pb is interposed, indicating penetrating (probably meson) showers. These showers were produced in the atmosphere, as the apparatus was effectively in the open air, and were about twice as frequent as Auger showers producing 71[illegible] particles on each 700 cm^2 tray, 50 cm. apart. The mechanism of production of these showers is discussed."

GROSHEV, L. V., RYTOV, S. M., LOVSHIN, V. L., FEYNBERG, Ye. L.,

"Physics Course, Vol. II (Electricity, Optics, Nuclear Physics)," Ministry of Higher Education of U. S. S. R., Moscow, 1947, (PAPALEKSI, N. D., Editor).

GROSHEV, L. Nov 1947

USSR/Physics
Gamma Rays
Nuclear Physics - Theory

"Possible Method for Investigating the Selective Absorption of GAmma Rays by Atom Nuclei," I. Barit, L. Groshev, M. Podgoretskiy, Physics Institute imeni P. N. Lebedev, Academy of Sciences of the USSR, 2 pp

"Dokl Ak Nauk" Vol LVIII, 58.6, No 6 - p.1011-12

An investigation of the selective absorption of gamma rays can give worth-while information on the plane of the atomic nucleus. Authors attempt to show that it is possible to study the selective absorption of gamma rays by the so-called self-indicator method, widely used in nuclear physics. Authors also explain the possibility of measurements of the width of lines for the resonance transfer G_2. Submitted by S. I. Vavilov 5 Jun 1947

PA 36T81

GROSHEV, L. V.

USSR/Nuclear Phys - Gamma Rays Feb 1947
Nuclear Phys - Impact, Electronic

"Angular Distribution of Electronic Pairs Produced by γ Rays of ThC," L. V. Groshev, I. M. Frank, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 2½ pp

"Zhur. Eksper. i Teoret Fiz." Vol XVII, No 2 pp 121-123.

Shows that dependence of distribution of angles between components of pairs formed by γ rays on the atomic number of the irradiated substance can differ, depending on method of pair registration employed. As result of this, the difference in results obtained with use of the Wilson chamber and the counters does not lead to contradiction.

[redacted] 57T70

GROSHEV, L. V.,

"Cosmic Rays", In *Sketches on the History of Physics in Russia*, A. K. Timiryazev, Editor, Gosudarstvennoe Uchebno-Pedagogicheskoe Izdatel'stvo, Moscow, 1949, p 317,

GROSHEV, L. V.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 67...

BOOK

Call No.: QC 787.I6V4

Authors: VEKSLER, V. I.; GROSHEV, L. V.; ISAYEV, B. M.

Full Title: IONIZATION METHODS OF RADIATION ANALYSIS

Transliterated Title: Ionizatsionnyye metody issledovaniya izlucheniy

PUBLISHING DATA

Originating Agency: None

Publishing House: State Publishing House of Technical and Theoretical Literature ("Gostekhizdat")

Date: 1949 No. pp.: 424 No. of copies: 5,000

Editorial Staff: None

PURPOSE: The book is intended for a wide range of scientific workers in various fields and for graduate students and teachers.

TEXT DATA

Coverage: Part I of this work (p. 9-162) discusses ionization chambers for alpha, beta, gamma radiation, for cosmic rays and fast neutrons, as well as impulse chambers. In part II (p-163-423) counters for charged particles are examined and the theories of their operation and of corrections for individual counters are given. Proportional counters, including those for fast particles and neutrons, and self-extinguishing and non self-extinguishing counters are examined in detail. New types of counters and different modes of operation

[illegible]OSHEV, L. V. and Skobel'tsyn, D. V.

"Atomic Energy," Bol'shaya Sovetskaya Entsiklopediya, Vol. 3, [illegible],
p. 527, 1949

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051702(

GROSHEV, L. V.,

"Some Particularities in the Distrib ution of Levels in Atomic Nuclei," Doklady Akademii Nauk SSSR, 1949, Vol. 65, No. 6, pp 823-826 (Fizicheskii Institut imeni P. N. Lebedeva Akademii Nauk SSSR).

"Tabulation of the known data of nuclear energy levels led to the conclusion that, by and large, and with the possible exclusion of too-light elements, the 1st excited level lies at about 800-1000 e. kv. in even nuclei (with even nos. of protons and of neutrons), and much lower, of at. no. Z). Deviations may be due partly to uncertainties of the data: in light elements, low levels may be difficult to detect owing to the very low probability of internal γ-conversion. If the conclusion is valid, it would follow that the position of the excited nuclear level is linked with the nuclear moment, which is an odd multiple of $h/4\pi$ in odd nuclei, and zero in even nuclei. Actually, even nuclei of the U-Ra radioactive disintegration series have energy levels of the order of 1000, whereas odd nuclei of the Th family have levels of the order of 100. Inasmuch as isomeric nuclear states have, mostly, low excitation energies, they will, for the most part, belong to the class of odd nuclei with even M but odd Z. Actually, of the known 45 nuclear isomers, only 2 (Ge^{72}, 5×10^{-7} sec., 720 e. kv., and Ce^{146}, 210 e. kv.) may belong to the class of even nuclei; 35 have odd M, at arbitrary Z, and 8 even M, with odd Z. The conclusion that, in nuclei of not too low Z, the 1st excited level lies high if the nuclear moment is zero, and low if the moment is $\neq 0$, is in accord with Mattlauch's (over)

finding (C. A. 36, 6889[5]) that even nuclei have no isomers. Indications are that, in light elements, the excitation energies of the 1st levels are in all cases substantially greater than at high Z."

No. 2

N

1767 Measurement of the Partial β Spectrum of ThB by the Method of Coincidences in a Double β Spectrometer. L. V. Groshev and L. Ya. Shavtvalov. Doklady Akad. Nauk S.S.S.R. 66, 257-60(1949)(in Russian).

A procedure is shown for the analysis of a complex β spectrum from a transformation in which the resulting nuclei occupy several excited levels. The usual β-γ coincidence method, convenient for the case of only one excited state, being inapplicable here, the authors employed β-β coincidences between a certain internal conversion and the corresponding β decay. The instrument consisted of a 2 m long metal pipe with a counter at each end; the radioactive source occupied the middle of the pipe, and the two opposite electron beams were focussed upon the counters by means of two magnetic lenses. One counter, through a fixed adjustment of its lens, received the conversion electrons, while into the other, by varying its len's field, decay electrons of different parts of the spectrum were directed. A frequency curve of the coincidences was thus obtained and was then converted into a Fermi curve of the level investigated. The method was used for the determination of the partial β spectrum of the transformation ThB → ThC which corresponds to a transition onto the excited level 238 kev; the γ quanta emitted are intensely converted. The source employed was a precipitate of Th(B + C + C″). The Fermi graph obtained is a straight line intersecting the energy axis at 340 kev.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

GROSHEV, L.V.

5

IAML

7859
IONIZATION METHODS OF INVESTIGATION. V. Veksler, L. Groshev, and B. Isaev. Moscow-Leningrad, Gostekhizdat, 1950. 427p. (In Russian) (Book on display at Geneva Conference)
Part I. Ionization chambers for α, β, γ, and cosmic radiations, chambers for neutrons and pulse chambers. Part II. Counters of charged particles, the theory of their operation and corrections for separate counters. Proportional counters (for fast particles and neutrons) and counters with individual discharges (non-self-extinguished and self-extinguished). (publisher's note)

[illegible], L., V[illegible], V. and [illegible], B.

"Ionizational Methods for Investigations of Radiations," Glavpoligrafizdat, Main Polygraphic Publishing House, 2nd edition, 437 p, 1952.

BOOK

Ca.. No.: QC475.G7

Author: Groshev, L.V. and Shapiro, I.S.
Full title: SPECTROSCOPY OF ATOM NUCLEI
Transliterated Title: Spektroskopiia atomnykh iader.

Publishing Data
Originating Agency: None.
Publishing House: State Publishing House of Technical-Theoretical Literature. Moscow.
Date: 1952 No. pp.: 440 No. of copies: 6,000

Editorial Staff:
Editor: None. Tech. Ed.: None.
Ed.-in-Chief: None. Appraiser: None.

Text Data
Coverage: The scope of the work is limited to radioactive nuclei and states of relatively low excitement in which nuclei form from the disintegration of alpha or beta. The work treats general problems of atom nuclei spectroscopy and special problems involved in gama, alpha, and beta spectroscopy. Methods of analysis and instruments are described. The material on methods applies to the analysis of radioactive radiation as well as to radiation of various atomic reactions. Subject index. 38 Tables. 233 Diagrams. Appendices.

Purpose: The main purpose of the work is to characterize the main ideas and research trends in atom nuclei spectroscopy; also, to give data on the most important results of recent studies in the field.

Facilities: None.
No. Russian & Slavic References: Of 288 references, 76 are Russian.
Available: Library of Congress.

GROSHEV, L. V.; BOCHKAREV, I. Keirim-Markus; L'VOVA, M.; [illegible], Ya.:

"Measuring the Activity of Beta and Gamma Radiation Sources," Izdatel'stvo Akademii Nauk SSSR, Moscow, 1953, 24 pp.

GROSHEV, L.V.; AD'YASEVICH, B.P.; DEMIDOV, A.M.

[Investigation of gamma rays emitted by nuclei in the capture of thermal neutrons] Issledovanie gamma-luchei, ispuskaemykh iadrami pri zakhvate teplovykh neitronov. Moskva, 1955. 36 p. (MIRA 14:7)

(Neutrons—Capture) (Gamma rays)
(Nuclei, Atomic)

GROSHEV, L.V.

4

The multiplication of neutrons in uranium-graphite systems. L. V. Groshev, B. L. Feinberg, and I. M. Frank. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 3-18 (English summary, 19-20); cf. following 3 abstracts. —The phys. aspect of neutron multiplication in a heterogeneous U-graphite system was discussed from the exptl. and theoretical standpoint. The expts. were carried out by the exponential method by using various concns. of U and for various temp. conditions. The values of the thermal neutron utilization const., θ, and of the multiplication const., k, were detd., and the effect of the air gap and of the water jacket around the slugs was studied. J. Rovtar Leach

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Lebedev Phys Inst, AS USSR

GROSHEV, L. V.

9

IRM

Investigation of the parameters of uranium-graphite heterogeneous systems by the prism method. L. V. Groshev, O. I. Kozmets, L. R. Lazareva, K. D. Tolstov, E. L. Feinberg, I. M. Frank, F. L. Shapiro, and I. V. Shtranikh. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 21-60(English summary, 61-2).—The buckling, $\varkappa^2$, the multiplication factor k, and the thermal utilization factor θ in a U-graphite heterogeneous system with const. slug diam. were investigated as a function of the U concn., C, in a Cd-shielded prism of 180 × 180 × 420 cm. The equidistant channels in the graphite could be filled either with U slugs or graphite rods. C in the prism was varied by removing metal from the channels. An at. concn. of $N/Nc = 0.013$, corresponding to a spacing of about 20 cm., is the arbitrary unit. About half of the channels were of larger diam. so that an air gap existed around the slugs; by moving the slugs from one channel into a wider one, the gap effect could be measured. The values $\varkappa^2$ and k were detd. according to the exponential method; both had a max. at $C = 0.8$, and were 0 at $C = 0.3$, and 1 at $C = 1.9$; θ was obtained from Cd-ratio measurements; a formula was derived $(1 - \theta)/\theta = (g/C) - h$, where g and h are consts. This agreed with the results of the diffusion theory. k/θ is a linear function of C; by extrapolating to $C = 0$ k can be split into two empirical factors ν_1 and φ. ν_1 is the no. of neutrons generated per thermal neutron captured; it is 1.31 ± 0.02. φ is the probability of fission neutrons reaching the thermal-energy region. Thus $1 - \varphi$ is the radiation capture in U, partially compensated by epicadmium U^{238} fission. It is a linear function of C. Both air gaps and H_2O gaps were tried for cooling. At $C < 1.5$ H_2O has a neg. effect on k and at >1.5 a pos. one; the air gap influences θ mostly, but both gap effects of air or H_2O were smaller than anticipated from the elementary diffusion theory; this is simply due to the one-velocity-group treatment, which is mathematically insufficient. Werner Jacobson

(2)

GROSHEV, L. V.

4

γ-Ray spectra of neutron capture of by some heavy nuclei. B. P. Ad'yasevich, L. V. Groshev, and A. M. Demidov. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 270-92(English summary, 293).—The results of measurements are given of the γ-ray spectra emitted by Cd, Sm, Hg, and Pb under neutron irradiation in the thermal column of the RFT reactor. The γ-ray spectra were measured in a magnetic spectrometer, where the Compton electrons produced in a thin radiator were sorted according to their energy. This instrument covered the energy range from 0.3 to 12 m.e.v. A large no. of peaks corresponding to monochromatic γ-rays were detected in the γ-ray spectra of Cd, Sm, and Hg. The corresponding γ-ray energies and the intensities expressed in photons/neutron capture were detd. There was satisfactory agreement with the values of other authors. γ-Decay schemes are drawn for Sm^{150}, Cd^{114}, and Hg^{200}. The γ-ray spectrum of Pb was measured after thermal neutron capture, thus one ground state transition was found both for Pb^{207} and Pb^{208}. Here, too, agreement with data by other authors is satisfactory. The neutron binding energies were detd. as 8.00 ± 0.03 m.e.v. for Sm^{150} and 8.03 ± 0.03 m.e.v. for Hg^{200}, with angular moments of the compd. nuclei of 0^{--} for Hg^{200} and 4^{--} for Sm^{150}; thus the ground state spin for Sm^{149} must be $7/2^-$. Multipolar orders and partial widths have been detd. for a no. of Cd, Sm, and Hg transitions, and the partial widths are compared with those obtained according to Weisskopf (*C.A.* 45, 10073g). 30 references.

Werner Jacobson

2

RML

GROSHEV, L. V., ADYASEVICH, B. P., DEMIDOV, A. M.,

Investigation of Rays Emitted by the Nuclei in Capture of Thermal Nuetrons," International Conference on the Peaceful Uses of Atomic Energy, 1955, A/Conf. 8/P/651 (USSR). Translation available at Battelle Memorial Institute.

Thermal neutron capture gamma radiation from nuclei has investigated with the aid of a Compton-electron magnetic spectrometer. The sample under investigation was irradiated with thermal neutron flux from the RTF reactor. Spectra of beryllium, sodium, sulphur and chlorine gamma rays have been measured in the energy range from 0.3 to 10 Mev. The treatment of results obtained made it possible to deduce the intensities of some spectral lines in terms of photons per neutron capture. For a number of transitions experimental radiation probabilities were compared with theoretical ones calculated from W. isskopf's formulas. Spins of some of the lower levels of Cl^{36} and Na^{24} were determined.

GROSHEV, L.V.

USSR/ Physics - Gamma-rays

Card 1/2 : Pub. 22 - 11/60

Authors : Groshev, L. V.

Title : Gamma-rays of the capture of thermal neutrons and a structure of atomic nuclei

Periodical : Dok. AN SSSR 100/4, 651-654, Feb 1, 1955

Abstract : A new method of studying spectra of γ rays originating at a capture of thermal neutrons by atomic nuclei is introduced. A quantity α $(=\Sigma n_i h\nu_i/\varepsilon_n)$ is suggested to be used for this purpose. The symbols are as follows: n_i is the number of photons of the $h\nu_i$ energy emanated during the capture of a hundred thermal neutrons and ε_n is the binding energy of a neutron in the nucleus. In order that the previous data can be used for the above formula, it is suggested that only those photones be counted the binding energy of which exceeds a certain arbitrary

Institution : Acad. of Scs., USSR, The P. N. Lebedev Physical Institute

Presented by : Academician D. V. Skobel'tsyn, October 9, 1954

Periodical : Dok. AN SSSR' 100/4, 651-654, Feb 1, 1955

Card 2/2 : Pub. 22 - 11/60

Abstract : quantity, i. e. $h\nu_1 \geqslant \frac{1}{2}\mathcal{E}_{cB}$ and to count a quantity $\alpha_{\frac{1}{2}} = \frac{(\sum n_i h\nu_i)\, h\nu_i > \frac{1}{2}\mathcal{E}_{cB}}{\mathcal{E}_{cB}}$ on

$$\alpha_{\frac{1}{2}} = \int_{\frac{1}{2}\mathcal{E}_{cB}}^{\mathcal{E}_{cB}} \frac{\nu(E)\, E\, dE}{\mathcal{E}_{cB}} , 100$$

where $\nu(E)$ is the number of photons of the energy $E = h\nu$. Five USA references (1950-1953). Diagrams.

USSR/Nuclear Physics - Structure and Properties of Nuclei, C-4

Abst. Journal: Referat Zhur - Fizika, No 12, 1956, 34004

Author: Adlyasevich, B. P., Groshev, L. V., Demidov, A. M., Lutsenko, V. M.

Institution: None

Title: Investigation of Gamma Rays Emitted by Nuclei of Calcium, Nickel, and Potassium During Capture of Thermal Neutrons

Original Periodical: Atom. Energiya, 1956, No 2, 28-39

Abstract: A magnetic spectrometer for analysis of Compton electrons is used to measure the energies and intensities of gamma rays emitted by nuclei of Ca, Ni, and K when they capture thermal neutrons. The spectra of the gamma rays were studied in the energy interval 0.25-12 Mev. The intensities of the gamma lines are given in gamma-quanta per 100 neutron captures. The possible schemes of gamma transitions in the nuclei Ca^{41}, Ni^{59}, Ni^{61}, and K^{40} have been compiled.

1 of 1

Groshev L.V.

USSR/Nuclear Physics - Structure and Properties of Nuclei C-4

Abst Journal : Referat Zhur - Fizika, No 12, 1956, 34001

Author : Ad'yasevich, B. P., Groshev, L. V., Demidov, A. M.

Institution : None

Title : Investigation of Gamma Rays Emitted by Nuclei of Titanium, Iron, and Silicon during Capture of Thermal Neutrons

Original Periodical : Atom. energiya, 1956, No 2, 40-49

Abstract : A magnetic spectrometer which analyzes Compton electrons was used to measure the energies and intensities of gamma rays occurring during the capture of thermal neutrons in Ti, Fe, and Si. The gamma ray spectra were studied in the energy interval between 0.25 and 12 Mev. The intensities of the gamma rays are expressed in numbers of gamma quanta/100 captures of neutrons. Possible schemes of gamma transitions in the nuclei of Ti^{49}, Fe^{57}, and Si^{29} have been compiled.

Card 1/1

13/0/1 - pmf

710

INVESTIGATION OF GAMMA-RAYS EMITTED BY NUCLEI OF CALCIUM, NICKEL, AND POTASSIUM ON CAPTURING THERMAL NEUTRONS. B. P. Adyasevich, L. V. Groshev, A. M. Demidov, and V. N. Lutsenko. Soviet J. Atomic Energy, No. 2, 171-82(1956).

4

The energies and intensities of γ rays emitted by nuclei of calcium, nickel and potassium when they capture thermal neutrons were measured by a magnetic spectrometer which analyzes the Compton electrons. The γ-ray spectra were studied in the energy interval 0.25 to 12 Mev. The intensities of γ ray are expressed in terms of the number of γ quanta emitted per 100 neutrons captured. Possible γ-transition diagrams have been constructed for Ca^{41}, Ni^{59}, Ni^{61} and K^{40} nuclei. The present work is a continuation of the investigation of γ rays emitted by nuclei on capturing thermal neutrons which is being carried out with the RFT reactor of the Academy of Sciences of the USSR. The experimental conditions, the method of measurement and the spectrometer have all been described before. Results are given on the investigation of γ rays from the nuclei of calcium, nickel and potassium. (auth)

GROSHEV, L. V.

711
INVESTIGATION OF GAMMA-RAYS EMITTED BY NUCLEI OF TITANIUM, IRON, AND SILICON ON CAPTURING THERMAL NEUTRONS. B. P. Adyasevich, L. V. Groshev, and A. M. Demidov. Soviet J. Atomic Energy, No. 2, 183-92(1956).

The energies and intensities of γ rays arising when thermal neutrons are captured in titanium, iron and silicon were measured by a magnetic spectrometer which analyzed the Compton electrons. The γ-ray spectra were studied in the energy interval 0.35 to 12 Mev. The intensities of the γ rays are expressed in terms of the number of γ quanta per 100 neutron captures. Possible γ-transition schemes have been constructed for Ti^{49}, Fe^{57} and Si^{29} nuclei. The present work is a continuation of the study of γ spectra, emitted by nuclei after capturing thermal neutrons, carried out with the aid of a magnetic γ spectrometer. In the present paper are given the results of the measurement of the energies and of the intensities of γ rays emitted by the nuclei of titanium, iron and silicon. The measurement of the intensity (number of γ quanta per capture) was carried out by means of normalizing the radiated energy to the binding energy of the neutron in the nucleus under investigation. (auth)

GROSHEV, L.V.

JOLIOT-CURIE, Frederic; SKOBEL'TSYN, D.V., akademik, otvetstvennyy redaktor; TAMM, I.Ye., redaktor; DZHELEPOV, B.S., redaktor; FRANK, I.M., redaktor; GROSHEV, L.V., redaktor; SMIRNOVA, O.N., redaktor; BARIT, I.Ya, redaktor izdatel'stva; RYNDZYUNSKAYA, S.M., redaktor izdatel'stva; ZELINKOVA, Ye.V., tekhnicheskiy redaktor; MAZARYAN, L.V., tekhnicheskiy redaktor

[Selected works. Work written in collaboration with Irene Joiot-Curie] Izbrannye trudy. Frederik i Iren Zholio-Kiuri. Sovmestnye trudy. Moskva, Izd-vo Akademii nauk SSSR, 1957. 561 p. (MIRA 10:2)
(Radioactivity)

AUTHOR: BEREZIN,V.S., GROSHEV,L.V., DIKAREV,V.S., EGIAZAROV,M.B., ~~KOROLEV,E.N.,~~ MADEEV,V.G., NIKOLEYEV,YU.G. PA - 2254

TITLE: The Spatial Distribution of the Folws of γ -Rays and of Slowed-down Neutrons in the Graphite Column of a Physical-Technical Reactor. (Prostranstvennoye razpredeleniye potokov γ -luchey i zamedlyayu sochikh neytronov v grafitovoy kolonne reaktora RFT, Russian).

PERIODICAL: Atomnaia Energiia, 1957, Vol 2, Nr 2, pp 118 - 122 (U.S.S.R.)

ABSTRACT: This distribution was investigated in spring 1953. The results obtained are suited also as experimental material for controlling the theory as well as for the computation of the spatial distribution of γ -rays and slowed down neutrons.
Experimental details: The thermal column (of graphite) of this reactor has a cross section of 100 x 100 cm^2 and a length of 200 cm. This column is separated from the active zone of the apparatus by an 80 cm thick graphite reflector and by a 45 cm thick layer of air and the sidewalls are surrounded by concrete. An experimental channel leads along the axis of the column, which is filled with graphite rods. The indicators were irradiated in the cavities of these graphite rods. The development of the density of thermal neutrons in graphite was measured by a dys-

Card 1/3

PA - 2254

The Spatial Distribution of the Flows of γ -Rays and of Slowed-down Neutrons in the Graphite Column of a Physical-Technical Reactor.

prosium indicator. As an indicator of the resonance neutrons, Indium surrounded by cadmium, gold and Iodine were used. Measurements were carried out when reactor operation had become steady. Measuring results of the spatial dispersion of the neutron fluxes of different energies in graphite are shown in form of diagrams. The neutron flux is diminished much more at the beginning of the thermal column than at its end. The curves of the reduction of the neutron fluxes change noticeably at a distance of from 160 to 180 cm. The fluxes of the resonance neutrons and of the fast neutrons are exponentially attenuated. The course of the curve of the density of thermal neutrons is discribed quite accurately by an exponential relation with the relaxation length L = 21,6 $\pm$ 0,1 cm. Also the decrease of the dosage of γ -rays in a graphite column is shown in a diagram.
Discussion of the results: In the asymptotic domain spatial and energy distribution of the slowed down neutrons is determined by that energy which corresponds to maximum scattering length. At great distances (> 180 cm) the resonance neutrons are probably produced by penetrating of fast neutrons. The spatial

Card 2/3

PA - 2254

The Spatial Distribution of the Flows of γ -Rays and of Slowed down Neutrons in the Graphite Column of a Physical-Technical Reactor.

distribution of fast neutrons then determines the spatial distribution of resonance neutrons. The experimental results obtained here are essentially a confirmation of the theory. (5 illustrations).

ASSOCIATION: Not given.
PRESENTED BY:
SUBMITTED: 17.5.1956.
AVAILABLE: Library of Congress.

Card 3/3

89-8-1/15

AUTHOR GROSHEV, L.V., DEMIDOV, A.M.

TITLE Nuclear Multiplets in Light Odd-Odd Nuclei and Their Manifestation in γ-Transitions Following Thermal Neutron Capture
(Yadernyye multiplety v legkikh nechetno-nechetnykh yadrakh i ikh proyavleniye v γ-perekhodakh posle zakhvata teplovogo neitrona. Russian)

PERIODICAL Atomnaya Energiya, 1957, Vol 2, Nr 8, pp 91 - 100 (U.S.S.R.)

ABSTRACT On the basis of the comparison of the hitherto experimentally found γ-transitions in even-odd (odd neutron) and even-even nuclei with $A < 60$, the presence of nuclear multiplets near the ground state is proved. The following nuclei were investigated:

$_{11}Na^{24}$, $_{12}Mg^{25}$, $_{13}Al^{28}$, $_{14}Si^{29}$, $_{15}P^{32}$, $_{16}S^{33}$, $_{19}K^{40}$, $_{20}Ca^{41}$, $_{21}Sc^{46}$, $_{22}Ti^{49}$, $_{23}V^{52}$, $_{24}Cr^{53}$, $_{25}Mn^{56}$, $_{26}Fe^{57}$, $_{28}Ni^{59}$.

(With 7 tables, 6 illustrations, 6 Slavic references).

ASSOCIATION Not given

PRESENTED BY

SUBMITTED 28.2.1957

AVAILABLE Library of Congress

Card 1/1

89-9-1/32

AUTHOR: GROSHEV, L.V., DEMIDOV, A.M., LUTSENKO, V.N., PELEKHOV, V.I.

TITLE: Investigation of the γ-Rays Emitted by the Nuclei of V, Mn, Co, Al on the Occasion of the Capture of Thermal Neutrons. (Issledovaniye γ-luchey, ispuskayemykh yadrami V, Mn, Co, Al pri zakhvate teplovykh neytronov)

PERIODICAL: Atomnaya Energiya, 1957, Vol 3, Nr 9, pp 187 - 203 (U.S.S.R.)

ABSTRACT: The energies of the γ-quanta were measured by means of a scintillation spectrometer. The γ-energies can, for comparison with other nuclear reaction measurements, be arranged in level schemes. The following levels (in MeV) were found with individual nuclei:

$V^{51}(n,\gamma)V^{52}$	$Mn^{55}(n,\gamma)Mn^{56}$	$Co^{59}(n,\gamma)Co^{60}$	$Al^{27}(n,\gamma)Al^{28}$
29 γ-lines	41 γ-lines	40 γ-lines	25 γ-lines
Niveaus in V^{52}	Niveaus in Mn^{56}	Niveaus in Co^{60}	Niveaus in Al^{28}
0,13	0,11	0,060	0,03
0,42	0,21	0,286	0,97
0,87	0,308	0,445	1,37
0,83	0,47	0,513	1,63
1,40	1,15	0,557	2,14
1,48	1,32	0,622	2,28

Card 1/2

89-9-1/32

Investigation of the γ-Rays Emitted by the Nuclei of V, Mn, Co, Al on the Occasion of the Capture of Thermal Neutrons.

1,55	1,53	0,972	3,10
1,75	1,73	1,012	3,29
1,79	2,05	1,237	3,46
1,84	2,23	1,533	3,60
2,09	2,47	1,825	3,88
2,13	2,54	2,154	4,03
2,15	2,68	2,295	4,24
2,31	3,83	2,610	4,69
2,42	7,26	3,138	4,77
2,46		7,51	4,90
2,53			5,14
2,85			5,47
3,00			5,77
3,05			6,25
3,14			6,76
3,31			7,728
7,296			

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With 7 tables, 16 illustrations and 4 Slavic References

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress

Groshev, L. V.

48-12-10/15

AUTHORS: Groshev, L. V., Demidov, A. M., Naydenov, V. A.

TITLE: Spectra of Electrons of Internal Conversion Which are Emitted in Captures of Thermal Neutrons by the Samarium-, Cadmium- and Gadolinium-Nuclei (Spektry elektronov vnutrenney konversii, ispuskayemykh pri zakhvate teplovykh neytronov yadrami samariya, kadmiya i gadoliniya)

PERIODICAL: Izvestiya AN SSSR, Seriya Fizicheskaya, 1957, Vol. 21, Nr 12, pp. 1619 - 1623 (USSR)

ABSTRACT: The spectra of electrons of internal conversion which develop in the radiation n, γ were investigated here. For this a magnet spectrometer was used with electrical recording of the electrons by counters placed far apart and connected to the coincidence-scheme. The apparatus was not the very best, as it possessed comparatively small light intensity and dissolving power. The measuring method and the apparatus are described in reference 4. The only difference consisted in the fact that the neutrons from the one of the channels of the reactor (PTR) immediately passed into the camera of the spectrometer and impinged upon the investigated sample. Sample 3 x 4 cm^2. The investigation of the line with 130 keV at a thickness of the sample of 0,78 Mcm^{-2} and 0,31 Mcm^{-2} in the spectrum

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48-12-10/15

Spectra of Electrons of Internal Conversion Which are Emitted in Captures of Thermal Neutrons by the Samarium-, Cadmium- and Gadolinium-Nuclei

of a Gd-sample showed that the peak-area in this range of thickness still increases linearly with the thickness of the sample. The data obtained for the energies and the multipolarity of the transitions in the investigated nuclei are given in a table. At energies of the electrons below 100 keV an essential decrease in the coefficient δ_2 was observed beside a widening of lines. The finding of the line-intensity became unreliable here and therefore at electron-energies below 100 keV no multipolarity for the peaks was determined. Multipolarities were determined for transitions with energies of 337 and 444 keV in Sm^{150}, 553 keV in Cd^{114}, 197 keV in Gd^{156}, 180 keV in Gd^{158}. For all these transitions may be assumed that they are transitions of the type E 2 which also is in agreement with the results of other works (references 1 - 3). There are 4 figures, 2 tables, and 9 references, 2 of which are Slavic.

AVAILABLE: Library of Congress

Card 2/2

GROSHEV, Leonid Vasil'yevich (Prof.)

"Thermal-Neutron Capture of Gamma-Ray Spectra and Nuclear Level Distribution", a paper to be presented at 1958 UN "Atoms-for-Peace" Conference, Geneva, Switzerland.).

GROSHEV, L.V.; DEMIDOV, A.M.; LUTSENKO, V.N.; PELEKHOV, V.I.

[Atlas of gamma spectra of radiative capture of thermal neutrons] Atlas spektrov γ-luchei radiatsionnogo zakhvata teplovykh neitronov. Izd-vo Glavnogo upravleniia po ispol'zovaniiu atomnoi energii, 1958. 198 p. (MIRA 13:3)
(Gamma rays--Spectra) (Neutrons--Capture)

AUTHORS: Groshev, L. V., Demido A.M., Lutsenko, V.N., Pelekhov, V.I. 89-1-1/29

TITLE: γ Ray Spectra Emitted by Even-Even Nuclei With Rotational Levels if the Nuclei Captured Thermal Neutrons (Spektry γ-luchey radiatsionnogo zakhvata neytronov dlya chetno-chetnykh izluchayushchikh yader s vrashchatel'nymi urovnyami)

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 5-21 (USSR)

ABSTRACT: By means of a magnetic Compton spectrometer the γ-spectra (E = 0.3-9 MeV) are measured and the following lines are obtained:

E γ in MeV

Gd^{157} (n,γ)	Gd^{155} (n,γ)	Gd(n,γ)	Er(n,γ)	Hf(n,γ)	Dy(n,γ)	Ta(n,γ)
6.74±0.01	7.33±0.03	(0.69±0.02)	6.680±0.015	6.39±0.04	5.87±0.02	6.04±0.02
6.44±0.03	6.74±0.03	(0.64±0.02)	6.202±0.015	6.14±0.02	5.580±0.015	5.94±0.03
5.88±0.03	6.40±0.035	0.55±0.02	6.07± 0.03	5.730±0.012	5.15±0.02	5.80±0.03
5.62±0.03	~4.5		5.88± 0.03	5.49±0.03	4.65±0.04	5.54±0.03
~5.2	1.24±0.02		5.73± 0.04	5.34±0.03	4.10±0.025	5.36±0.03

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γ-Ray Spectra Emitted by Even-Even Nuclei With Rotational Levels if the Nuclei Captured Thermal Neutrons

89-1-1/29

4.92±0.04	1.17±0.02
1.33±0.02	1.06±0.02
1.26±0.02	(0.96±0.02)
1.185±0.015	
1.110±0.015	
0.96±0.02	
0.800±0.015	
0.78±0.02	

5.34±0.03	4.92±0.03	3.48±0.03	5.24±0.03
4.770±0.035	4.80±0.45	3.14±0.03	4.99±0.03
4.66±0.03	4.54±0.04	3.04±0.03	4.83±0.03
4.420±0.045	4.385±0.015	2.86±0.03	
4.1	1.415±0.015	2.74±0.025	
1.9	1.339±0.015	0.42±0.02	
1.3	1.30±0.02		
1.01±0.02	1.220±0.015		
0.94±0.02	1.180±0.015		
0.828±0.01	1.090±0.015		
0.736±0.015			
0.64±0.02			

Some γ-quanta of the nuclei can be well classified in level schemata. The following levels are excited with certainty:

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γ Ray Spectra Emitted by Even-Even Nuclei With Rotational Levels if the Nuclei Captured Thermal Neutrons 89-1-1/29

Gd^{158} E_γ in MeV	Gd^{156} E_γ in MeV	Er^{168} E_γ in MeV
0	0	0
0.08	0.089	0.080
0.26	0.287	0.265
1.11	1.17	1.08
1.20	1.24	1.28
1.25	8.46	1.80
1.40		7.76
7.87		

There are 15 figures, 11 tables, and 26 references, 5 of which are Slavic.

SUBMITTED: August 31, 1957

AVAILABLE: Library of Congress

Card 3/3

AUTHORS: Vlasov, N., Groshev, L., Mostovoy, V., Pevzner, M., 89-1-20/29

TITLE: Interaction Between Neutrons and Nuclei (Vzaimodeystviye neytronov s yadrami).

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 96 - 101 (USSR)

ABSTRACT: From September 9, to September 13, 1957 an International Conference took place at New York Columbia University, which was attended by more than 200 physicists. A total of 70 lectures was delivered. The most important results are the following: The reaction cross section for $B^{10}(n,\alpha)$, $Li^{6}(n,\alpha)$ and $He^{3}(n,p)$ must be measured with much greater accuracy.
Description of a neutron spectrometer with a pulsating neutron source from a synchrocyclotron. Resolving power obtained: $> 0,01$ μs/m with a flying distance of 35 m.
A mechanical selector which attains a ray-resolution of 0,01 to 0,015 μs/m
At Nd^{143} a negative point of resonance was uniquely found:

$$E_0 = -1,5 \pm 0,5 \text{ eV}; \quad \sigma_0 \Gamma^2 = 415 \text{ b(eV)}^2.$$

Determination of the yields of various isotopes at the fission of U^{233} with $E_n = 1,8$ eV and the fission of U^{235} with $E_n > 2$ eV.
A three-fold fission of U^{235} with neutrons in the energy range of from 0,02 to 0,2 eV was not found.

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Interaction Between Neutrons and Nuclei.

89-1-20/29

A magnetic spectrograph was built for the purpose of measuring the energy of fission fragments.
For Pu^{240} resonances at E_n = 1,056 eV; 20,4 eV and 38,2 eV were found. For Pu^{242} only resonances at 2,65 and 53,6 eV were found up to 1 KeV. For I^{129} and Zr^{93} no resonance was found within the range of from 1 to 100 eV.

$$\frac{\sigma_f(U^{233})}{\sigma_f(U^{235})} = 0,9323 \pm 0,0013$$

$$\frac{\sigma_f(Pu^{239})}{\sigma_f(U^{235})} = 1,4056 \pm 0,0009$$

$$\frac{\sigma_f(Pu^{239})}{\sigma_f(U^{233})} = 1,5048 \pm 0,0009$$

$$\frac{\sigma_f(Pu^{241})}{\sigma_f(Pu^{239})} = 1,351 \pm 0,0006$$

for neutrons with Maxwell distribution and T = 20°C

σ_0 for Au : 98,8 ± 0,3 b E_n = 2200 m/sec

$T_{1/2}$ of U^{233} = (1,611 ± 0,008) . 10^5a

σ_f for U^{233} : 524 ± 4 b E_n = 2200 m/sec

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Interaction Between Neutrons and Nuclei.

89-1-20/29

$$\frac{\int \sigma_c \frac{dE}{E}}{\sigma_c \text{ 2200 m/sec}} = 25,5 \pm 5,0\% \text{ for } Pu^{240}$$

The folbwing reactions are described:

$U^{235}(d,p)$; $U^{235}(d,pf)$; $U^{238}(d,p)$; $U^{238}(d,pf)$ $E_d = 14$ MeV

$U^{238}(n,n')$; $U^{235}(n,n')$; $Pu^{239}(n,n')$ $E_n = 0,55$; 1,0 and 2,0 MeV

$Fe^{56}(n,n')$; $I^{127}(n,n')$ $E_n = \sim 1,5$ MeV

$F(n,\gamma)$ - 15 resonances from 2 to 15 eV were found

(n-p), (n-α), (n-2n) reactions on various elements

D(p,n) $E_d = 3,5$ up to 3,9 MeV.

Furthermore, the γ- spectra of the most varied n-γ processes were measured. There are 2 figures.

AVAILABLE: Library of Congress

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AUTHOR: Varshalovich, D.

SOV/53-65-4-10/13

TITLE: VIII Annual Congress on Nuclear Spectroscopy (VIII yezhegodnoye soveshchaniye po yadernoy spektroskopii). IV

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 65, Nr 4, pp. 725 - 726 (USSR)

ABSTRACT: Continuation of the list of lectures held at the Congress of Nuclear Spectroscopy, Leningrad, January 27 - February 3, 1958. L.V.Groshev, A.M.Demidov, V.N.Lutsenko and V.I. Pelekhov (AN SSSR) gave a report on γ-spectra of Gd^{156}, Gd^{158}, Er^{168}, Hf^{178}, Dy^{165} and Ta^{182}; B.S.Dzhelepov, N.N.Zhukovskiy, I.F.Uchevatkin and S.A.Shestopalova (VNIIM) on the γ-spectrum of Ra in the range of 200 - 1500 keV; A.A.Vorob'yev, A.P.Komar, G.A.Korolev and G.Ye.Solvakin (LFTI) on the spectrum Sm^{147} ($T_{1/2} = 10^{12}$ a) and of Pu^{238}, observed by means of an ionization spectrometer; A.P.Komar, G.A.Korolev, G.Ye.Kocharov (LFTI) investigated the excited states of Th^{230} and Th^{234} by the method of the $(\alpha - e_k)$-coincidence; B.V.Pshenichnikov and Yu.I.Filimonov (LFTI) reported on investigations of the

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VIII Annual Congress on Nuclear Spectroscopy. IV SOV/53-65-4-10/13

U^{235} decay by means of the methods of the (α-γ)-coincidence and of the (α-γ) angular correlations; L.L.Gol'din, G.I. Grishuk and Ye.F.Tret'yakov (TTL AN SSSR) on the conversion spectrum of Pu^{239}; L.L.Gol'din, V.B.Dedov and L.N.Kondrat'yev (TTL AN SSSR) on the α-spectrum os Sm^{242}; L.A.Khalfin (VIRG), A.G.Zelenkov (AN SSSR) and Sator Salan and Denesh Bereni (Hungary) spoke on devices applied in spectrography and spectrometry, respectively;L.L.Gol'din, G.I.Grishuk and Ye.F. Tret'yakov (TTL AN SSSR) gave an account of an ironless β-spectrometer; K.V.Abramova,Ya.Zhilich, Ya.Kormitskiy and B.I. Peregud (LFTI) reported on the stabilization of direct current and of electromagnetic fields; I.Ya.Korol'kov of the automatic measurement of γ-spectra; A.I.Zhernovoy, Yu. S. Grigor'yev, G.D.Latyshev (LIIZhT) on the measurement and stabilization of magnetic fields on the basis of the magnetic resonance of protons; E.M.Krisyuk and G.D.Latyshev (LIIZhT) on the problem of compensating the earth's magnetic field; Ye.L.Stolyarova and S.G.Chukhina (MIFI) spoke about a γ-scintillation spectrometer; N.V.Lazarev (TTL AN SSSR) reported on the same subject; M.P.Sokolov (AN SSSR) reported on an automatic differential analyzer; V.R.Burmistrov (MRTP) on a

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scintillation counter; A.Ye.Melamid and N.S.Khlebnikov (MRTP) on photoelectronic amplifiers. The authors: A.G. Berkovskiy, L.G.Leyteyzen, V.G.Pol'skiy and A.G.Berkovskiy, I.Ya. Breydo, B.M.Glukhovskoy, O.S.Korol'kova, L.G.Leyteyzen, Ye.I.Tarasova (MRTP)in two lectures gave a report on photo-electronic amplifiers for scintillation spectrometers; V.A. Filimonov (MGU) spoke about the interaction of Λ-particles with nucleons and on the binding energy of the hypernuclei He^3_Λ, H^4_Λ,and He^5_Λ; V.M.Strutinskiy and V.G.Nosov (AN SSSR) on the cascade emission of γ-quanta; D.D.Ivanenko and E.V. Teodorovich (MGU) on the Lamb shift in hydrogen ; A.S.Basina, K.A.Baskova, B.S.Dzhelepov and M.A.Dolgoborodova (LGU) on measurements of the angular distribution of the quanta in the positron annihilation in liquid hydrogen and helium; N.A.Guliyev (Baku) on the polarization of nucleons (E= 130 MeV) in the scattering on Al and Cu nuclei.
The lectures are published in the periodicals: "Izvestiya Akademii nauk (Ser.Fiz.)" and "Atomnaya Energiya".

[illegible], I. V.

21(0) PHASE I BOOK EXPLOITATION SOV/2081

International Conference on the Peaceful Uses of Atomic Energy, 2d., Geneva, 1958

Doklady sovetskikh uchenykh; yadernaya fizika (Reports of Soviet Scientists; Nuclear Physics) Moscow, Atomizdat, 1959. 552 p. (Series: Its: Trudy, Vol. 1) 8,000 copies printed.

Eds. (Title page): A.I. Alikhanov, Academician; V.I. Veksler, Academician; and N.A. Vlasov, Candidate of Physical and Mathematical Sciences; Ed. of this volume: G.I. Brodov and B.P. Zaretskiy, Candidates of Physical and Mathematical Sciences; Ed. (Inside book): G.L. Gurliyan; Tech. Ed.: Ye.I. Mazel'.

PURPOSE: This collection of articles is intended for scientific research workers and other persons interested in nuclear physics. The volume contains 43 papers presented by Soviet scientists at the Second Conference on Peaceful Uses of Atomic Energy, held in Geneva in September 1958.

COVERAGE: It is divided into two parts. Part I contains 17 papers dealing with plasma physics and controlled thermonuclear Reactions, and Part II contains 26 papers on nuclear physics, including problems of particle acceleration and of cosmic ray physics. The first paper by L.A. Artsimovich presents a review of Soviet work on controlled thermonuclear reactions. The remaining papers in Part I deal with particular problems in this field.

The papers in Part II deal in detail with various problems in nuclear physics, such as the fission of heavy atoms and their isotopes, and with the study of cosmic radiation by means of artificial earth satellites and rockets, described in a paper by S.N. Vernov. The Russian-language edition of the proceedings of the conference is published in 16 volumes. The first 6 volumes contain all the papers presented by Soviet scientists as follows: Volume (1), Yadernaya fizika (Nuclear Physics); Volume (2), Yadernyye reaktory i yadernaya energetika (Nuclear Reactors and Nuclear Power); Volume (3), Yadernoye goryucheye i reaktornyye metally (Nuclear Fuel and Reactor Metals), Volume (4), Khimiya radioelementov i radiatsionnykh prevrashcheniy (Chemistry of Radioelements and of Radiation Transformations); Volume 5, Radiobiologiya i radiatsionnaya meditsina (Radiobiology and Radiation Medicine); Volume (6) Polucheniye i primeneniye izotopov (Production and Use of Isotopes). The other 10 volumes contain selected papers presented at the Conference by non-Soviet scientists. In the present volume discrepancies between the English and Russian language) edition of the proceedings have been noted in three articles where the texts are not identical; viz; Andrianov, et al, "High Current Pulsed Discharge"; Akhiyezer, et al, "High Frequency Plasma Oscillation"; and Rogalyubov, "Investigations of the Many-body Problem". The serial numbers of reports 2302 and 2304 are reversed in the English edition. Report 2211, by Simolnikov, et al, is numbered 2536 in the English edition.

TABLE OF CONTENTS:

Reports of Soviet Scientists; Nuclear (Cont.) SOV/2081

21(7)

SOV/89-6-3-5/29

AUTHORS: Groshev, L. V., Gavrilov, B. I., Demidov, A. M.

TITLE: Investigation of γ-Radiation Emitted by Nuclei at Capture of Thermal Neutrons (Issledovaniye γ-luchey, ispuskayemykh yadrami pri zakhvate teplovykh neytronov)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 3, pp 281 - 289 (USSR)

ABSTRACT: The Compton- (Kompton) spectrometer used in the measurement of the γ-spectra has already been described in reference 2. The spectrometer was located in such a way opposite to the target and the neutron irradiation duct of the reactor VVR of the AS USSR, as to expose only the target to the direct neutron and γ-beam from the active zone of the reactor. The γ-radiation originating from the target was collimated over a length of 3650 mm by means of 7 lead diaphragms. The predominating weakness of the spectrometer is its unusually high γ-background, which is caused by its being placed very near to the reactor. In order to suppress this background the whole spectrometer was surrounded by a water tank and paraffin bricks, respectively, and the measuring chamber of the spectrometer was protected by a lead shield about

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Investigation of γ-Radiation Emitted by Nuclei at Capture of Thermal Neutrons SOV/89-6-3-5/29

10 cm thick. The intensity and the energy of the γ-radiation originating from neutron capture was measured for the following nuclei: P, Sc, Cr, Cu, Zn, Sn, and Sb. The values obtained generally show a good agreement with values determined earlier. The preparations of the individual element were treated as follows: P_2O_5 was put into a bakelite box, which could be sealed hermetically. The preparation was besides inserted into an aluminum casing with a wall thickness of 1 mm. The target had a diameter of 140 mm, a length of 120 mm and a weight of 1.5 kg. Caused by the presence of the intensive capture γ-lines originating from the hydrogen, lead and aluminum in the preparation it was impossible to record the γ-spectrum of P^{32} in the range of 3.22 and >7 MeV. Sc_2O_3. The target had a diameter of 100 mm and a weight of 25 g. The preparation was housed in a graphite container. No measurements could be conducted in the range of 2.23 and ~ 7.38 MeV due to the intensive background caused by the reaction $H(n,\gamma)D$, $Pb^{207}(n,\gamma)Pb^{208}$.

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Investigation of γ-Radiation Emitted by Nuclei at Capture of Thermal Neutrons

SOV/89-6-3-5/29

Cr_2O_3: The target had a diameter of 120 mm, a length of 10 mm and a weight of 1 kg. The γ-spectrum of the chromium isotopes 53 and 54 could not accurately be recorded in the range of 7.38 MeV.

Cu and Zn: The targets consisted of a ring with a diameter of 110 mm and a thickness of 20 mm. They weighed 1.7 and ~ 1.3 kg, respectively. The target was exposed to the incident neutron beam at an angle of 45°. The background was in the range of 7.38 MeV very weak. For this reason this region could be measured for these two elements. A. S. Volkov prepared and performed the stabilization and the measurement of the magnetic field. There are 7 figures, 4 tables, and 13 references, 5 of which are Soviet.

SUBMITTED: November 17, 1958

Card 3/3

21(9)
SOV/89-7-3-11/29

AUTHORS: Groshev, L. V., Demidov, A. M.

TITLE: The Spectrum of γ-Rays of the IRT Reactor

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 3, pp 257-258 (USSR)

ABSTRACT: A channel tube extending as far as the reactor core of the IRT-reactor is partly filled with boron carbide and paraffin and a lead screening substance. In the lead screening substance there is a thin central channel, through which the γ-quanta produced in the reactor core reach a γ-spectrometer described in reference 2. The γ-spectrum of the core is superimposed by a number of γ-lines, which originate from the (n,γ)-processes on Al (the material from which the reactor is built), C (graphite reflector) U^{235} and U^{238} and from the radioactive nuclei produced in these processes. If these γ-lines are eliminated from the measured spectrum, the γ-spectrum corresponding to the core of the IRT-reactor remains. Both spectra are graphically represented. For the latter, the relative intensity of each γ-domain, i.e. divided into 11 intervals, from 0.2 - 7.72 Mev is in addition tabulated. The IRT-spectrum is distinguished from the spectrum of the RFT-reactor especially

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The Spectrum of γ-Rays of the IRT Reactor SOV/89-7-3-11/29

by the fact that in the latter the high-energy part of the spectrum is more pronounced, because here iron, nickel, and chromium are used as building materials, and because the (n,γ) processes on these elements have a great yield. There are 1 figure, 1 table, and 3 Soviet references.

SUBMITTED: May 4, 1959

Card 2/2

21 (1)

AUTHORS: Groshev, L. V., Demidov, A. M. SOV/89-7-4-2/28

TITLE: On M1-Transitions From Highly Excited States

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 4, pp 321-328 (USSR)

ABSTRACT: First, a short report is given on earlier papers dealing with this subject. It is of interest, on the basis of the single-particle model to investigate the probabilities of M1-transitions from the initial state for such nuclei as lie within the same range of atomic weights. First, the forbidden M1-transitions under investigation in the single-particle model are discussed. The authors confine themselves to analyzing the M1-transitions of even-odd nuclei produced in a reaction (n,γ). In nuclei with A of from 20 to 60 M1-transitions were found to occur in the nuclei Mg^{25}, Si^{29}, S^{33}, and Ca^{41}. The M1-transitions from the initial state lead to levels with characteristics $1/2^+$ or $3/2^+$. For determining the order of this prohibition of the investigated M1-transitions it is necessary to compare their probabilities with those of the permitted transitions, which are determined by the formulas for the single-particle model. Table 1 contains the radiation widths and the densities of the

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neutron-s-resonances of the nuclei with A = 20 to A = 40. These data are very inaccurate and, in some cases, even wrong. The second rather voluminous table gives data concerning M1-transitions from the initial states of even-odd nuclei. This table also contains the characteristic properties of the states between which a transition occurs. All M1-transitions may be subdivided into two large groups which differ by the amount of the variation of the orbital moment of the neutron in the transition. The M1-transition in Si^{29}, which leads to a level with isotropic distribution of protons in the reaction (d,p), is given in addition. The next part deals with the causes for canceling the prohibition. In heavy nuclei with odd atomic weights a large number of forbidden M1-transitions with $\Delta l = 2$ is found to occur between the lower levels. The experimental data on these transitions are discussed in more detail in an appendix. The following causes do not come into consideration according to the authors' opinion: (1) Interaction by the exchange of charges and spins between two nucleons. (2) Spin orbit coupling. (3) Coupling of nucleons and the surface oscillations of the nucleus. The most natural

explanation for the observed probabilities of the M1-transitions is apparently the mixing of the probabilities of M1-transitions in the initial and final state. The last part of the present paper deals with M1-transitions in odd-odd nuclei. Also in this case the transitions are subdivided into groups according to the variation Δl_n, and, besides, a transition in Na^{24} to the level with the energy of 0.47 Mev is sorted out. An appendix deals with M1-transitions between the weakly excited states of heavy nuclei. There are 2 figures, 4 tables, and 28 references, 6 of which are Soviet.

SUBMITTED: May 15, 1959

GROSHEV, L.V.

"Radiative Capture of Slow Neutrons (Survey)"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 Jluy 1960.

GROSHEV, L.V.; DEMIDOV, A.M.; PELEKHOV, V.I.

[Spectra of gamma rays accompanying the capture of thermal neutrons by Mo, Nd, Ho, Tu, and La nuclei] Spektry γ - luchei, soprovozhdaiushchikh zakhvat teplovykh neitronov iadrami Mo, Nd, Ho, Tu, i La. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 19 p. (MIRA 17:2)

26.2264

S/048/60/024/007/002/011
B019/B060

AUTHORS: Groshev, L. V., Demidov, A. M., Lutsenko, V. N., Malov, A. F.

TITLE: A Magnetic Gamma Spectrometer 19 With High Resolving Power

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 7, pp. 791-801

TEXT: This is the reproduction of a lecture delivered at the 10th All-Union Conference on Nuclear Spectroscopy held in Moscow from January 19 to 27, 1960. The authors describe a new magnetic Compton spectrometer which allows the gamma spectrum to be measured in the energy range of 0.3-12 Mev with a resolution of 0.3% at $h\nu > 2$ Mev. Resolution becomes poorer at lower energies. Fig. 1 shows a scheme of the experimental arrangement, in which the spectrometer described here was used and which served for investigating the spectrum of gamma emission caused by the capture of thermal neutrons. The sample investigated was placed in a core-tangential channel of an ИРТ(IRT) reactor near the core and was collimated with iron and lead diaphragms. The neutrons were filtered by means of a 10 cm thick paraffin

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layer. The novelty in the spectrometer described here consists in that the energy of the Compton electrons is analyzed with two different magnetic fields. The first axisymmetric magnetic field is produced in a device called separator and collects the Compton electrons coming from the converter by means of a horizontal and a vertical slit on a counter C_1. The electrons then reach a magnetic analyzer, the β-spectrometer proper and are there again collected on a counter C_2. In the experiment, the dependence of the number of pulse coincidences in the counters C_1 and C_2 on the magnitude of the analyzer field is measured, the separator field changing with the analyzer field. The authors then give formulas (1) and (2) which describe the magnetic field. In the following sections, they describe the capture angles of electrons, the resolving power, the spectral sensitivity of the spectrometer and its construction in great detail. The authors finally thank D. V. Pavlov for his calculation of the magnet system, I. M. Kamyshev for having designed the instrument and for having provided the drawings, A. S. Volkov for having worked out the electronic equipment, and the reactor team for their assistance in the measurements. There are 8 figures and 12 references: 6 Soviet, 5 US, and 1 Swedish.

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Card 2/2

32503
S/048/60/024/007/002/011
B104/B201

21.6000

AUTHORS: Groshev, L. V., Demidov, A. M., Lutsenko, V. N., and Malov, A. F.

TITLE: A magnetic gamma spectrometer with high resolving power

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 24, no. 7, 1960, 791 - 901

TEXT: The present paper has been read at the 10th All-Union Conference on Nuclear Spectroscopy, Moscow, January 19 - 27, 1960. A new magnetic Compton spectrometer is described, which allows the gamma spectrum to be measured in the energy range of 0.3 - 12 Mev with a resolution of 0.3% at hν 2 Mev. Resolution becomes poorer at lower energies. Fig. 1 shows a scheme of the experimental arrangement, in which the spectrometer described here was used and which served for examining the spectrum of gamma emission accompanying the capture of thermal neutrons by nuclei. The sample concerned was placed in a core-tangential channel of an (IRT) reactor near the core. The gamma rays were collimated through lead and iron filters, and the neutrons were absorbed by a 10-cm thick paraffin

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31501
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B104/B201

A magnetic gamma spectrometer...

layer. The novelty in the spectrometer described here consists in that the energy of Compton electrons is analyzed with two different magnetic fields (Fig. 2). In the so-called separator the Compton electrons ejected from the converter (K) are collected by an axisymmetric field, pass through a horizontal and a vertical slit, then a counter D_1, reach a magnetic analyzer serving as β-spectrometer, are again collected, pass through a third slit, and hit the counter C_2. In the experiment, the dependence of pulse coincidences in the counters C_1 and C_2 on the analyzer field is measured, the separator field changing with the analyzer field. The authors then give formulas

$$H(r) = H_0\left[1 - 0{,}80\,\frac{r-r_0}{r_0} + 0{,}65\left(\frac{r-r_0}{r_0}\right)^2\right], \qquad (1)$$

$$H(R) = H_0\left[1 - \frac{1}{2}\left(\frac{R-R_0}{R_0}\right) + \frac{1}{8}\left(\frac{R-R_0}{R_0}\right)^2 + \frac{1}{16}\left(\frac{R-R_0}{R_0}\right)^3\right] \qquad (2)$$

which describe the radial variation of the magnetic fields in the separator and analyzer, respectively. In the sections coming next, they de-

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A magnetic gamma spectrometer... 31503
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scribe the capture angles of electrons, the resolving power, the spectral sensitivity of the spectrometer, and its construction in great detail. D. V. Pavlov is thanked for his calculation of the magnetic system, I. M. Kamyshev for having designed the device and for having provided the drawings, A. S. Volkov is thanked for having worked out the electronic equipment, and the reactor team for their assistance in the measurements. There are 8 figures, 1 table, and 12 references: 6 Soviet-bloc and 6 non-Soviet-bloc.

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S/048/60/024/007/016/032/XX
B104/B201

AUTHORS: Groshev, L. V., Demidov, A. M., and Lutsenko, V. N.

TITLE: Spectrum of the gamma rays from the reaction $Cl^{35}(n,\gamma)Cl^{36}$

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 24, no. 7, 1960, 833-838

TEXT: The present paper has been read at the 10th All-Union Conference on Nuclear Spectroscopy, Moscow, January 19-27, 1960. The authors studied the spectrum of the gamma rays formed during the capture of thermal neutrons by Cl^{35}. The measurements were made by the new magnetic Compton spectrometer, which is described in this issue (Groshev et al., pp. 791-801), on NaCl samples (50·100·190 mm). The gamma spectra obtained are shown in Fig. 1 ($h\nu$ = 4.8-8.7 Mev) and Fig. 2 ($h\nu$ = 0.2-4.8 Mev). The nature of the counting background caused by gamma radiation in the reactor channel and in the converter is discussed thoroughly. The first cause of the background formation is said to be the radiation coming from the reactor channel, and the second cause, the formation of electron pairs in the converter due to gamma

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radiation. Energies and intensities of gamma rays, arising in the reaction $Cl^{35}(n,\gamma)Cl^{36}$, are collected in a table. These data served as the basis for the construction of the part of gamma transitions of the Cl^{36} nucleus, as shown in Fig. 4, using the results of a study of the (d,p) reaction by Paris et al. (Phys. Rev., 100, 1317 (1955)). Special interest was attached to the neighboring 1.957 Mev and 1.949 Mev levels. This part of the spectrum is presented in detail in Fig. 5. The part of the gamma transition scheme shown in Fig. 4 is described and discussed thoroughly. Four variants of the quantum characteristics of levels are dealt with in a detailed discussion, making use of data on the orbital momenta, which have been obtained by I. B. Teplov (Zh. eksper. i teor. fiz., 31, 25 (1956)). It is finally stated that data available so far permit no opinion to be expressed as to the authenticity of one or the other variant. There are 5 figures, 1 table, and 11 references: 4 Soviet-bloc and 7 non-Soviet-bloc.

Legend to Fig. 1: Part of gamma spectrum of NaCl in the energy range $h\nu$ = 4.8-8.7 Mev. 1) coincidences/3 minutes.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051702(

GROSHEV, L. V., DEMIDOV, A. M., LUTSENKO, V. N., PELEKHOV, V. I.

"(n,γ) Reactions Studies at the IRT Reactor of the USSR Academy of Science"

paper presented at the Symposium of the International Atomic Energy Agency on Pile Neutron Research in Physics, Vienna, 17-21 Oct 1960.

GROSHEV, L.V.; DEMIDOV, A.M.; PELEKHOV, V.I.

Spectra of gamma rays produced in the capture of thermal neutrons by heavy nuclei. Part 1. Zhur.eksp.i teor.fiz. 38 no.2:588-597 F '60. (MIRA 14:5)

(Gamma rays) (Neutrons—Capture)

STRUTINSKIY, V.M.; GROSHEV, L.V.; AKIMOVA, M.K.

Spectra of gamma rays produced in the capture of thermal neutrons by heavy nuclei. Part 2. Zhur.eksp.i teor.fiz. 38 no.2:598-611 F '60. (MIRA 14:5)

(Gamma rays) (Neutrons--Capture)

GROSHEV, L. V.

"Decay of Gd^{156} and Gd^{158} ,"

report presented at the Conference on Low Energy Nuclear Spectra, Cppenhagen, 23-27 May 1961.

Inst. of Atomic Energy, Moscow

33004
S/641/61/000/000/031/033
B102/B138

26.2246

AUTHORS: Groshev, L. V., Demidov, A. M., Pelekhov, V. I.

TITLE: Spectra of γ-rays accompanying thermal neutron capture by Mo, Nd, Ho, Tu and La nuclei

SOURCE: Krupchitskiy, P. A., ed. Neytronnaya fizika; sbornik statey. Moscow, 1961, 335 - 347

TEXT: This is a continuation of previous investigations of thermal (n,γ)-reactions (c.f. Groshev et al., Lecture at First Geneva Conference 1955); experimental apparatus and arrangement have already been described. This paper gives the results in great detail. Mo: A specimen of 1.4 kg total weight, consisting of disks 55 mm in diameter, was used to measure the spectrum in the 0.3-10 Mev range. Up to 80 % of the thermal neutrons were captured by Mo^{95}. Nd: Range 0.3 to 9 Mev, 200-g specimen of Nd_2O_3. 77 % of the spectrum is due to γ-transitions of Nd^{144}. The binding energy, B_n, of the last neutron in Nd^{144} was found to be 7.80 ± 0.02 Mev. Ho: Range 0.3 to 7.5 Mev, 50-g specimen of Ho_2O_3. The

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33004

Spectra of γ-rays accompanying... S/641/61/000/000/031/033
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high-energy edge of the spectrum is at 6.15 Mev, $B_n > 6.15$ Mev. Tu: Range 0.3 to 7.5 Mev, 50 g specimen of Tu_2O_3. High energy edge: 6.56 $\pm$ 0.02 Mev; $B_n \geqslant 6.56$ Mev. La: Range. 0.3 to 7.5 Mev, 400-g La_2O_3 specimen containing no impurities of other rare earths. Lines previous found at 1.18, 0.74 and 0.44 Mev with impure specimens and attributed to La^{140} were found to be due to γ-transitions of Gd. B_n was $\geqslant 5.145 \pm 0.015$ Mev. This is somewhat higher than found by Johnson and Nier. The 5.145-Mev line is attributed to a transition to the ground state and the arguments for this assumption are discussed. There are 12 figures, 5 tables, and 8 references: 4 Soviet and 4 non-Soviet The four references to English-language publications read as follows: B. B. Kinsey, G A. Bartholomew. Canad. J. Phys. 31, 1051 (1953); G. A. Bartholomew. L. A. Higgs. Compilation of Thermal Neutron Capture Gamma Rays. Chalk River, Canada, AECL-669 (1958); W. H. Johnson, A. O. Nier. Phys. Rev. 105, 1014 (1957); P. Boskma, H. De Waard. Nucl. Phys., 14, 145 (1959).

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33005

5.5310

S/641/61/000/000/032/033
B102/B138

AUTHORS: Groshev, L. V., Demidov, A. M., Pelekhov, V. I.

TITLE: Determination of slight gadolinium and samarium impurities by gamma spectrum analysis with (n,γ) reactions

SOURCE: Krupchitskiy, P. A., ed. Neytronnaya fizika; sbornik statey. Moscow, 1961, 348-353

TEXT: Thermal neutron capture gamma rays can, in certain circumstances, be used for quantitative determination of rare-earth impurities, provided a magnetic Compton spectrometer of high resolution is available. The impurities to be determined must have large, and the substance in which they are contained, small, σ_n and B_n values. σ_n is the thermal neutron capture cross section and B_n is the binding energy of the last neutron. The method was tested by determining Sm and Gd impurities in other rare-earth substances. The minimum concentrations which can be determined with a Compton γ-spectrometer of 2 % resolution are given in the table. The 6.74- and 7.22-Mev lines, which are characteristic of Gd and Sm, have energies above the B_n value of most of the rare earths. Several spectra

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33005

Determination of slight...

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are given and discussed as examples. The method is limited in its application, due to the σ_n and B_n requirements given above and the necessity of using large specimens (50-100 g) in this type of spectrometer There are 4 figures, 1 table, and 3 references: 1 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: G. A. Bartholomew, L. A. Higgs. Compilation of Thermal Neutron Capture Gamma Rays. Chalk River, Canada. AECL-669, 1958; G. Backstrom. Nucl. Instrum. and Methods, 4, 5 (1959).

X

Legend to the Table: (1) Element; (2) Impurity concentration.

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GR[illegible], I.[illegible].; [illegible], [illegible].; [illegible]V, [illegible].; [illegible], [illegible].;
[illegible], [illegible].

[illegible] levels of Gd^{156} and Gd^{158}. [illegible] 142 no.1:57-[illegible].
([illegible] 14:1[illegible])

1. Pre[illegible]stavleno akademikom I.A. [illegible]ovichem.
(Gadolinium--Isotopes)
(Quantum theory)

S/903/62/000/000/039/044
B102/B234

AUTHOR: Groshev, L. V.

TITLE: Radiative capture of slow neutrons

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 515-524

TEXT: The author reviews the most important results obtained in the last few years, both in the USSR (especially in the Institut atomnoy energii AN SSSR - Institute of Atomic Energy AS USSR) and abroad, on low-energy (n,γ) reactions also in the case of resonance. The theory of radiative resonance capture of slow neutrons is briefly considered as to the determination of the coefficients C^{λ}_{ck} entering the ψfunction of the state λ formed on neutron capture. Also the problems of direct neutron capture is dealt with (Nucl. Phys. 13, 205, 1959; Progr. Theor. Phys., 23, 161, 1960). The last chapter of the article deals with the new types of spectrometers developed in the last year for detecting thermal-neutron (n,γ) reactions (Can. J. Phys., 37, 203, 1959; Rev. Sci. Instr. 28, 233, 1957; BAPS, II, 4, 476, 1959). The

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Radiative capture of slow neutrons S/903/62/000/000/039/044
B102/B234

review ends with 1960 as it was presented at a conference held in 1960. There are 2 figures, 2 tables, and 38 references.

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S/903/62/000/000/041/044
B102/B234

AUTHORS: ~~Groshev, L. V.,~~ Demidov, A. M., Lutsenko, V. N., Pelekhov, V. I.

TITLE: Radiative properties of the Cd^{114} lower levels

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 548-550

TEXT: The authors investigated the $Cd^{113}(n,\gamma)Cd^{114}$ reaction induced by thermal neutrons and measured the γ-ray spectra in the range 0.3-9.5 Mev as well as the conversion electron spectra in the range 0.3-2 Mev. The measurements were made with a new type of Compton magnetic spectrometer with 0.3% resolution at $h\nu > 2$ Mev and with a special conversion spectrometer with 0.6% resolution. Energies, characteristics and coefficients of the transitions were determined (Table) for emission of γ-quanta (I) and internal conversion electrons (II). The results obtained are discussed on the basis of the vibration model (Phys. Rev. 103, 1035, 1956). It is assumed that the levels 1135, 1207 and 1283 kev form a two-phonon triplet; it is, however, not impossible that the $0^{+'}$ level of 1135 kev is due to the excitation of a

Radiative properties of the... S/903/62/000/000/041/044
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neutron pair. The 1848-kev level, far away from the triplet, is a 0^+ level (Cohen, Price, Private Communication). The 552, 650 and 1207 kev levels have the reduced E2 transition probabilities of 36, 60 and 0.76 Weisskopf units which agrees with the collective nature of the 2^+-$2^{+'}$ levels according to the vibration model. There is 1 table.

ASSOCIATION: Institut atomnoy energii im. I. V. Kurchatova AN SSSR (Institute of Atomic Energy imeni I. V. Kurchatov AS USSR)

E, kev	$\alpha_K \cdot 10^4$ I	α_K/α_{L+M} II	
557	4,7*	5	E2
650	3,1	5	
708	3,5	—	
726	2,3	—	E2, or M1, or E2+M1
748	2,1	—	
808	2,8	—	
1135	>20	—	0^+—0^+
1305	>1000	6,5	0^+—0^+

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GROSHEV, L.V.; DEMIDOV, A.M.; PELEKHOV, V.I.

Gamma-ray spectra generated in neutron capture by heavy nuclei. Trudy Inst.fiz.AN Gruz.SSR 8:81-94 '62. (MIRA 16:2)
(Gamma-ray spectrometry) (Neutrons--Capture)

GROSHEV, L.V.; DEMIDOV, A.M.

Determining the burn-out of fuel rods by means of a magnetic gamma-spectrometer. Atom. energ. 13 no.5:458-466 N '62. (MIRA 15:11)

(Nuclear fuels)
(Gamma-ray spectrometry)

S/048/62/026/008/003/028
B163/B104

AUTHORS: Groshev, L. V., Demidov, A. M., Lutsenko, V. N., and Pelekhov, V. I.

TITLE: Spectra of γ-rays and internal conversion electrons from the reaction $Cd^{113}(n,\gamma)Cd^{114}$

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 8, 1962, 979 - 992

TEXT: The γ-spectra in the energy range from 0.4 to 9.5 Mev were measured in a magnetic Compton spectrometer giving a resolution of 0.3% for energies above 2 Mev and of 0.6% at E_{γ} = 1 Mev, described earlier by Groshev et al. (Izv. AN SSSR. Ser. fiz., 24, 791 (1960)). The spectrum of internal conversion electrons in the energy range from 20 kev to 3 Mev was measured in a magnetic beta spectrometer with a resolution of 0.6% at $E_e > 300$ kev and of 1% at lower electron energies, described earlier by Pelekhov and Malov (Izv. AN SSSR. Ser. fiz. 25, 1069 (1961)). The energy levels of Cd^{114} are of interest for investigating the lower levels in even-even nuclei. To measure the γ-spectrum, a metallic cadmium target consisting of the natural

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B163/B104

Spectra of γ rays and ...

mixture of isotopes was bombarded with thermal neutrons. In the γ-spectrum 132 lines were resolved, containing 37% of the total energy released by the neutron capture. To measure the internal conversion spectrum a cadmium oxide target of 0.8 mg/cm^2 thickness, enriched to 85% Cd^{113} on an aluminum backing foil was used. This spectrum contained 36 lines up to energies of 1.7 Mev. The energies, relative intensities, and internal conversion coefficients of the lines were tabulated. From these data, a level scheme was constructed assuming that the relatively intense lines with energies above 5 Mev correspond to transitions from the initial state formed by the neutron capture to the lower nuclear levels. The binding energy of the last neutron in Cd^{114} was found to be 9041 ± 3 kev. The characteristics of lowest levels at 558, 1134, 1209, 1283, 1306, 1364, 1732, 1841, 1958 kev above the ground state are discussed. The lowest of these levels are well known from earlier Coulomb excitation, β decay and (dp) reaction experiments. The 1306 kev conversion line is thought to correspond to a $0^+ - 0^+$ transition from the 1306 kev level to the ground state and the 1305 kev γ line is thought to belong to another level. For the levels at 1134 and 1209 kev the ratios of reduced branching probabilities are consistent with calculations for vibration models. It is concluded that the 1730, 1841, and

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Spectra of γ-rays and ... S/048/62/026/008/003/028
B163/B104

1958 kev levels have the characteristics 4^+, 1^+ and 3^- respectively. The squared transition matrix elements for the first 30 transitions from the initial state to the lower levels are given in a table. For the first 20 transitions they are low, but for the next 10 transitions to excitation levels above 3 Mev the squared matrix elements are much larger. There are 5 figures and 6 tables.

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40667

S/048/62/026/009/001/011
B125/B186

212500

AUTHORS: Groshev, L. V., Demidov, A. M., Ivanov, V. A., Lutsenko, V. N., and Pelekhov, V. I.

TITLE: Spectra of γ-rays and internal conversion electrons arising in the (nγ)-reaction on gadolinium isotopes

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 9, 1962, 1119-1133

TEXT: The spectra of the γ-rays that arise when thermal neutrons are captured by Gd^{155} (capture cross section 61000 ± 5000 barn) and Gd^{157} (capture cross section 240000 ± 12000 barn) were taken in the energy range .4 to 9 Mev. The inner conversion electron spectra were taken at electron energies of 20 kev to 3 Mev by magnetic spectrometers. The Gd_2O_3 specimens were enriched in Gd^{155} and Gd^{157}. The γ spectra measurements and the apparatus have been described by Groshev L. V. et al. (Izv. AN SSSR, Ser. fiz., 791 (1960)). The internal conversion electron spectra were determined using the same enriched gadolinium

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isotopes ... in the measurements of γ-radiation spectra. The internal conversion electron lines were separated from these spectra. Their intensity, the K-shell conversion coefficient α_K, the ratio α_K/α_L and the type of the transition are given. In measuring most of the levels of the Gd^{156} γ-transition scheme it has been assumed that the γ-lines with $E > (B_n - 3)$ Mev correspond to an initial state. This initial state arises when the neutron is captured onto lower levels of the nucleus. The levels within the energy gap of 2.1 Mev (for Gd^{156}) and 1.7 Mev (for Gd^{158}) are described separately. Most of the levels above 1621 kev were determined from the transitions out of the initial state. The Gd^{156} γ-transition scheme was established on the same basic considerations as the Gd^{158} γ-transition scheme. The levels with 1198, 1258, 14.., 1521, 1373, 1454 kev are described separately. The lines contained in the spectra of internal conversion electrons with 496, 669, 687, 700 and 707 kev for Gd^{156} and with 438, 457, 702 and 746 kev

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Spectra of γ rays and internal ...

S/048/62/026/009/001/011
B125/B186

for $Gd^{15?}$ could not be detected in the γ-ray spectra. The transitions with 5??, 615 and 674 kev in Gd^{156} and 538 kev in Gd^{158} show increased conversion. There are 5 figures and 6 tables.

X

Card 5/5

S/048/63/027/002/009/023
B104/B180

AUTHORS: Groshev, L. V., Demidov, A. M., Ivanov, V. A., Lutsenko, V. N., and Pelekhov, V. I.

TITLE: The levels of the Sm^{150} nucleus excited by the (n,γ) reaction

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 2, 1963, 216 - 227

TEXT: The γ-spectrum of Sm^{150} was investigated with a magnetic Compton spectrometer with a resolution of 0.3% in the range 0.3 - 8 Mev. The spectrum of internal conversion electrons was investigated with a magnetic spectrometer with resolution 0.6%. From the results, represented in two large figures and one table, the level scheme of Sm^{150} is constructed. The levels with 334, 740, 773, 1047, 1071, 1167, 1256 and 1278 kev are discussed in detail and the Sm^{150} level is compared with that of Gd^{152} (Fig. 5). It is shown that corresponding levels of Sm^{150} and Gd^{152} have similar radiation properties. Further the Gd^{152} transition between the

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2^+ levels with 929 and 344 kev have an exaggerated conversion (α_K = 0.026) which is more than for the M1 transition. It may be due to the contribution of an E0-transition. The analogous Sm^{150} transitions between the 2^+ levels with 1047 and 334 kev has a conversion factor of α_K = 0.0074, which corresponds to a non-forbidden M1 transition. As type $2^+ \longrightarrow 2^+$ M1-transitions are forbidden in heavy even-even nuclei, it is assumed that E0 and E2 transitions make a small contribution. There are 5 figures and 5 tables.

Fig. 5. Comparison of the Sm^{150} and Gd^{152} level schemes.

The levels of the Sm^{150} nucleus...

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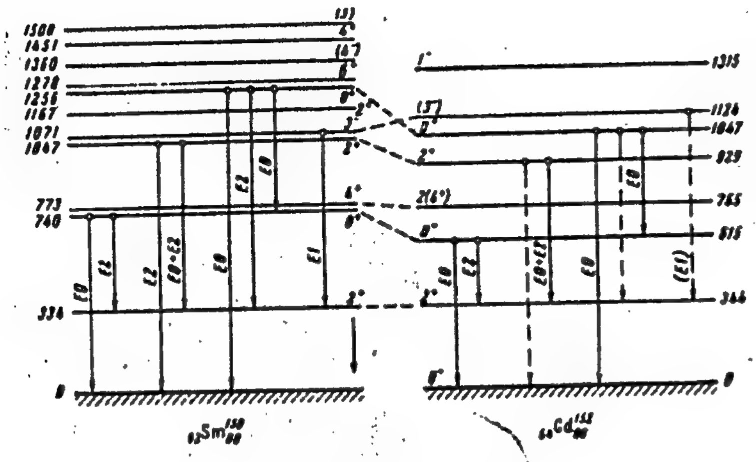
B104/B180

Fig. 5



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GROSHEV, L.V.; DEMIDOV, A.M.; IVANOV, V.A.; LUTSENKO, V.N.; PELEKHOV, V.I.

Spectra of gamma rays and internal conversion electrons emitted in the capture of thermal neutrons by mercury nuclei. Izv. AN SSSR. Ser. fiz. 27 no.11:1377-1391 N '63. (MIRA 16:11)

1. Institut atomnoy energii im. I.V. Kurchatova.

GROSHEV, L. V.; SHADIYEV, N.

"Nuclear levels of Ho^{166} from reaction (n, γ).

report submitted for Intl Conf on Low & Medium Energies Nuclear Physics, Paris, 2-8 Jul 64.

Kurchatov Inst, Moscow.

GROSHEV, L. V.; DEMIDOV, A. M.; KOTEL'NIKOV, G. A.; LUTSENKO, V. N. 3

"Gamma-Rays from the Reaction $Sc^{45}(n,\gamma)Sc^{46}$."

"The Spectrum of Gamma Rays from the Reaction $Fe^{56}(n,\gamma)Fe^{57}$."

reports submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

IAE (Inst Atomic Energy, AS USSR)

GROSHEV, L. V.; DEMIDOV, A. M.; IVANOV, V. A.; LUTSENKO, V. N.; PELEKHOV, V. I.

"Gamma Rays and Electrons of Internal Conversion from the Reaction $Hf^{177}(n,\gamma)Hf^{178}$."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

IAE (Inst Atomic Energy)

GROSHEV, L. V.; DEMIDOV, A. I.; KOTEL'NIKOV, G. A.; LUTSENKO, V. N.; PELEKHOV, V. I.

"Levels of the Nucleus Rh^{104} Excited by the Capture of Thermal Neutrons."

reports submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

IAE(Inst Atomic Energy, AS USSR)

ACCESSION NR: AP4042958 S/0048/64/028/007/1118/1123

AUTHOR: Groshev, L.V.; Demidov, A.M.; Kotel'nikov, G.A.; Lutsenko, V.N.; Pelekhov, V.I.

TITLE: The levels of rhodium 104 excited in thermal neutron capture /Report, 14th Annual Conference on Nuclear Spectroscopy held in Tibilisi 14-21 Feb 1964/

SOURCE: AN SSSR. Izv.Seriya fizicheskaya, v.28, no.7, 1964, 1118-1123

TOPIC T GS: neutron capture, gamma ray spectrum, decay scheme, electron spectrum, rhodium

ABSTRACT: The γ-ray spectrum of Rh^{104} excited by thermal neutron capture in Rh^{103} was recorded with a magnetic Compton spectrometer with a resolution of 0.3%. The spectrometer and the experimental technique are described elsewhere (L.V.Groshev, A.M.Demidov, V.N.Lutsenko and A.F.Malov, Izv.AN SSSR,Sér.fiz.24,791,1960). Fifty-one lines were observed with energies from 4.885 to 6.998 MeV and intensities from 9×10^{-5} to 2.3×10^{-2} photons per capture. The internal conversion spectrum of Rh^{104} was observed with a magnetic spectrometer having a resolution of 0.6%. Again the instrument and experimental techniques are described elsewhere (V.I.Pelekhov and

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ACCESSION NR: AP4042958

A.F.Malov, Izv.AN SSSR,Ser.fiz.25,1069,1961). The β-spectrum was examined from 60 to 2500 keV, but the large continuous background prevented lines from being observed at energies greater than 200 keV. Below this energy ten internal conversion lines were distinguished. The most intense line (74 keV) was assumed to be the K conversion line of the M1 transition from the 97 keV isomeric state (R.C.Greenwood,Phys. Rev.129,345,1963) and to have the theoretical value of the internal conversion coefficient. From this assumption, and from the relative intensities of the γ-rays obtained by private communication from O.Schult, the internal conversion coefficients of six other lines were calculated and their multipole order determined. Five lines were found to be due to E1 transitions and one to an M1. One of these assignments is in conflict with a previous assignment by A.S.Molioranskiy, L.F.Kalinkin and I. V.Estulin (Vozbuzhdenny*ye sostoyaniya Rh^{104}. Izd.Mosk.gos.un-ta 1963). If one assumes that the most energetic of the observed neutron capture γ-rays is due to direct transition to the ground state, one finds that the calculated neutron binding energy is in good agreement with the value obtained from the (d,p) reaction, and that of the 30 levels that lie within the region that has been explored by means of the (d,p) reaction, all but 5 coincide with previously known states. A striking feature of the γ-ray spectrum is that the high-energy lines resulting from transitions to levels lying below 0.8 MeV are generally considerably lower energy than the

ACCESSION NR: AP4042958

loss energetic lines. This can be explained by a hypothesis of N.Starfelt (Preprint, 1963) involving the M1 giant resonance. The present authors offer an alternative explanation based on the assumption that the neutron is captured in an s state. E1 transitions to the low-lying levels would then be multiparticle transitions, and thus weak, and M1 transitions would be forbidden by the orbital angular momentum selection rule for the neutron. A decision between the two explanations might be reached by determining the character of the transitions concerned, for these should be M1 transitions in the one case and E1 transitions in the other. Orig.art.has: 3 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00

SUB CODE: NP NR REF SOV: 008 OTHER: 010

ACCESSION NR: AP4042970 S/0048/64/028/007/1234/1243

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TITLE: Spectrum of gamma-rays from neutron capture by iron 56 /Report, 14th Annual Conference on Nuclear Spectroscopy held in Tibilisi 14-21 Feb 1964/

SOURCE: AN SSSR. Izv. Seriy fizicheskaya, v.28, no.7, 1964, 1234-1243

TOPIC TAGS: neutron capture, gamma-ray spectrum, iron

ABSTRACT: The γ-ray spectrum excited in thermal neutron capture by natural iron was recorded with a magnetic Compton spectrograph that afforded a resolution of 0.3% above 2 MeV and 0.6% at 1 MeV, and is described elsewhere (L.V.Groshev, A.M. Demidov, V.N.Lutsenko and A.F.Malov, Izv.AN SSSR, Ser.fiz.24,791,1960). Sixty γ-rays were observed with energies from 1.264 to 10.038 MeV and intensities from 7×10^{-4} to 0.215 photons per capture. The assignment of these γ-rays to the various iron isotopes is discussed, and it is concluded that 44 of them arise from transitions in Fe^{57} induced by neutron capture by Fe^{56}. The hardest γ-ray assigned to Fe^{57} has an energy of 7.642 MeV. The spectrum was analyzed, and a level scheme is presented for Fe^{57} which includes, in addition to the 7.643 MeV $1/2^-$ state into which the

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neutron is captured, 21 states with energies not greater than 4.688 MeV. The states are compared with states known from (p,p') and (d,p) reactions, and spins and parities are assigned to 10 of them. From a consideration of intensity sums it is concluded that the scheme includes 87% of all the γ-ray transitions of Fe^{57} excited by neutron capture. The intensities of the γ-rays originating in the initial state are compared with the reduced neutron widths and spectroscopic factors obtained from the (d,p) reaction. The comparison is performed in the same way that similar comparisons have been previously performed for other nuclei (L.V.Groshev, A.M.Demidov, V.N.Lutsenko and V.I.Pelekhov, Doklady* sovetskikh ucheny*kh na Vtoroy mezhdunarodnoy konferentsii po mirnomu ispol'zovaniyu atomnoy energii /Reports of Soviet scientists to the 2nd International Conf. on the Peaceful Use of Atomic Energy/ Yadernaya fizika 1,281.Atomizdat,1959). Although some correlation is found, it is not striking. It is suggested that the poor correlation may be due to a complex structure of the wave function of the initial state of Fe^{57} produced by neutron capture by Fe^{56}. The γ-decay of various of the states of Fe^{57} is discussed in some detail in relation to numerous calculations and experimental data in the literature Orig.art.has: 4 figures and 3 tables.

ACCESSION NR: AP4042971 S/0048/64/028/007/1244/1254

AUTHOR: Groshev, L.V.; Demidov, A.M.; Ivanov, V.A.; Lutsenko, V.N.; Pelekhov, V.I.

TITLE: Gamma-rays and internal conversion electrons from neutron capture of hafnium 177 /Report, 14th Annual Conference on Nuclear Spectroscopy held in Tibilisi 14-21 Feb 1964/

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v.28, no.7, 1964, 1244-1254

TOPIC TAGS: neutron capture, gamma-ray spectrum, electron spectrum, hafnium

ABSTRACT: The γ-ray spectrum excited by thermal neutron capture by natural hafnium was recorded with a magnetic Compton spectrometer with a resolution of 0.3% above 2 MeV and 0.6% at 1 MeV (see L.V.Groshev, A.M.Demidov, V.N.Lutsenko and A.F. Malov, Izv.AN SSSR, Ser.fiz.24,791,1960). The internal conversion spectrum of Hf^{178} was observed for a target containing 89% Hf^{177}. The magnetic spectrometer employed had a resolution of 0.6% and is described elsewhere (V.I.Pelekhov and A.F.Malov, Izv.AN SSSR, Ser.fiz.25,1069,1961). A level scheme for Hf^{178} is presented. Sixty-seven γ-ray lines were observed with energies from 1.066 to 7.826 MeV and intensities from 1.6×10^{-4} to 6.4×10^{-2} photons per capture. The assignment of these

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γ-rays to the various hafnium isotopes is discussed at length. Of the 18 lines recorded with energies less than 1.5 MeV, all but 3 were observed with enriched material by R.K.Smither (Phys.Rev.129,1691,1963) and are ascribed to Hf^{178}. The relative intensities of these lines were largely in agreement with those found by Smither; there were discrepancies, however, and in these cases the authors prefer their own data because of the higher resolution of their spectrometer. It is concluded after an involved discussion that of the remaining lines, those with energies greater than 6.1 MeV can be safely attributed to Hf^{178} and those with lower energies cannot. Forty-two internal conversion lines were observed with energies from 82 to 1587 keV. Internal conversion coefficients were calculated for 23 of these lines, but multipolarities were assigned only to the 9 least energetic because of the absence of any suitable standard lines of high energy. The 260 keV K con ersion line of the 325 keV γ-transition was assumed to be due to an E2 transition for calculating the internal conversion coefficients, and Smither's γ-ray intensities were employed. The level scheme given for Hf^{178} comprises, in addition to the 7.619 MeV 3^-, 4^- levels into which the neutron is captured, 15 states with excitations not greater than 1.513 MeV. The scheme is in general similar to that given by Smither (loc.cit.), but there are differences that are discussed in detail. Some spin and parity assignments are in doubt, and more experimental work is de-